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# JOURNAL OF FARM ECONOMICS

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VOL. II.

OCTOBER, 1920.

No. 4

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## CAN THE FARMS OF THE UNITED STATES PAY FOR THEMSELVES?<sup>1</sup>

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Of late years there has been considerable stir concerning the "back-to-the-land" movement. Much might honestly be said in its favor; more has been said than the evidence in the case seems to warrant. The city man on the farm has not always been a success. Possibly he has failed more times than he has succeeded; that, however, is aside. The "folly" farm of the rich deserves no consideration here. Only that farm where the operator has tried to build a home and earn a living demands serious attention.

Men not only from the city, but from the rural districts as well, have tried to "break into the farming game." This used to be easy so long as good farms could be secured by homesteading or by buying up the claim of a pioneer so discontented that he chose to try elsewhere. A man could then come into possession of farming land without a great outlay in capital. Now, however, the whole thing is changed. It is no longer easy to acquire ownership of good tillable land. A would-be farm owner who has no birthright on the land must either take land bearing a handicap (such as stumps, swamps, alkali minerals, stones, poor topography, depleted fertility, long distance from the railroad, or some other natural barrier to an easy conquering of the land) or purchase a developed farmstead.

<sup>1</sup> Contribution from the Department of Field Crops, Utah Experiment Station.

<sup>2</sup> The author is indebted to Doctors F. S. Harris, M. C. Merrill and E. B. Brossard, who offered constructive criticism on the manuscript. Special mention is due to Mr. I. J. Jensen who kindly checked the figures in Tables 1, 2 and 3.

This study which deals with the purchase method of acquiring land indicates that it is difficult to pay for a farm out of the proceeds of that farm. It further indicates that the difficulty is so great as materially to destroy the incentive for purchase on the part of a legitimate prospective tiller of the soil. The rapid increase in tenancy in some of the most prosperous farming sections seems to bear out the conclusion that it is more profitable for the small farmer to let some one with more ready capital own the land.

This must not of course be interpreted to mean that agriculture as a pursuit is endangered. If there could be but one industry in the universe, that one must of necessity be agriculture. So long as people dwell upon the earth, crops and animals will be produced and always more and more efficiently. It is doubtful, however, if the farmers of the United States are likely ever again to be able to acquire the ownership of land on easy terms. As a consequence, one of two things—possibly both—is likely to happen. In the first place, the poorer farmers may be gradually crowded from the land—at least from ownership—leaving only the most fit to occupy the place of owner-operator. In the second place, it may happen that non-resident capitalists may come into possession of the land. This class of land-owners is able to purchase high-priced land even with low rental returns because of the security of the investment and because of the almost certain increase in land values, the unearned increment making the investment profitable.

It is conceivable also that a change in relative prices, due to a readjustment in production, marketing, or distribution, may again make possible the easy acquirement of land. The present study, however, does not aspire to deal with economic problems of such magnitude. A brief survey of the present condition is all that is aimed at.

At the very outset it is well to admit that there are fairly frequent "lucky" purchases of the farms which pay for themselves handsomely in a few years. However, when whole districts are considered, it is likely that these promising purchases are occasional rather than usual.

#### AREAS SURVEYED.

The author has studied the problem from several points of view. After two years' experience as an instructor in farm management he coöperated during the summer of 1915 with the Office of Farm Management of the United States Department of Agriculture in a farm-management survey in three of the counties of Utah. The idea that

ordinary farms could not pay for themselves suggested itself on several occasions. During the winter of 1915-16 much data were worked over and tabulated. In 1916 and 1917 an opportunity was offered to study at first hand the conditions in south central New York State. This experience and further study at Cornell University served only to strengthen the original impression that farms were no longer easy to acquire. Accordingly, during the school years of 1917-1918 and 1918-1919 the scope of study was enlarged and made to include all areas of the United States for which published surveys were readily available. The data were then worked up into tabular form and later rechecked several times. The areas used are from such various parts of the country as to represent rather typical regions. This can be seen from the fact that there are 26 areas in 21 states scattered rather widely over the United States. As can be seen by referring to the tables, three of these states are in the North Atlantic division, eight in the north central states, three in the south central group, three in the southern states, and four in the western or mountain states.

In three states two areas for each state are reported. In Utah are three surveyed areas. In each case either a different type of farming is represented or a change in the region. They are as follows:

Area	Type of Farming
<i>Georgia</i>	
Brooks County (coastal plains) ..	Cotton.
Sumter County (coastal plains) ..	Cotton and livestock—especially hogs.
<i>Kentucky</i>	
Bluegrass region .....	Tobacco and livestock.
Southwestern .....	Wheat, tobacco, and general farming.
<i>Illinois</i>	
Kane County .....	Dairy.
West central .....	Grain, livestock, and general farming.
<i>Utah</i>	
Provo area .....	Small orchards, sugar-beets, and some livestock.
Six Counties .....	Various: from nearly pure livestock to diversified general farming,—sugar-beets in some, not in others.
Salt Lake Valley .....	Diversified general farming—sugar-beets, hay, and some trucking.

The other areas are one in each state. They show the following types:

Areas	Type of Farming
<i>North Atlantic States</i>	
New York .....	General farming.
New Jersey .....	Potato growing.
Pennsylvania .....	Market milk and hay.
<i>North Central States</i>	
Indiana .....	Grain and livestock.
Iowa .....	Grain, hay, beef cattle and hogs.
Michigan .....	General farming.
Minnesota .....	Grain and livestock.
Nebraska .....	Hogs, cattle, corn and winter wheat.
Ohio (hill region) .....	"Mixed" beef cattle, sheep and feed crops.
Wisconsin .....	Dairying.
<i>South Central States</i>	
Missouri .....	Wheat, corn, cattle and hogs.
West Virginia .....	Average for state (taken from census).
<i>Southern States</i>	
South Carolina (coastal plains) ..	Cotton with some livestock.
Texas (heavy soil) .....	Cotton with some corn and hogs.
<i>Western States</i>	
Arizona .....	Dairying, alfalfa, and beef cattle.
Montana .....	Small grains and cattle.
Oregon .....	Small grains.

The facts reported in some of the publications could not be used because of incomplete data. As a whole, however, all that gave comparable data were taken, and in most cases the entire number is represented. The averages used throughout were weighted by multiplying the data for each group of farms by the number of farms in that group. By this means a true average was more nearly approximated than would have been the case otherwise.

#### *Data Accumulated for Study.*

A summary of the capital, farm income, and labor income when interest on the capital is computed at 5, 6, 8, or 10 per cent, is shown in Table I.

Table 2 shows the annual payment necessary to amortize the farm in 10, 20, or 30 years with interest on the mortgage at 5, 6, 8, or 10 per cent. This was computed from the "average capital" column of

TABLE 1.—Summary of Capital, Farm Income, and Labor Income on Farms when Interest on Capital is Computed at 5, 6, 8, and 10 Percent.

State.	Area.	Number of Farms.	Average Capital.	Farm Income.	Labor Income.			
					5%.	6%.	8%.	10%.
<i>North Atlantic States:</i>								
New York (25)*.....	Tompkins County	749	5,527	757	423	367	257	146
New Jersey (1).....	Monmouth "	343	19,165	1,699	846	652	271	112
Pennsylvania (21).....	Chester "	378	10,486	1,313	789	684	474	265
<i>North Central States:</i>								
Illinois (4).....	Kane County	59	37,896	2,766	1,023	644	114	872
Illinois (23).....	West Central	73	51,091	3,176	622	111	911	1,933
Indiana (23).....	Central	123	17,535	1,187	310	135	215	566
Iowa (23).....	West Central	77	23,193	1,450	291	59	405	869
Michigan (10).....	Lenawee County	300	11,756	1,068	481	363	128	107
Minnesota (5).....	Southeastern	231	14,636	1,170	438	292	0	292
Nebraska (12).....	Eastern	195	26,646	1,717	385	119	413	945
Ohio (15).....	Washington County	73	5,652	443	161	104	9	122
Wisconsin (4).....	Green County	84	31,036	1,940	730	420	201	822
<i>South Central States:</i>								
Kentucky (3).....	Bluegrass Region	187	37,793	2,576	686	308	448	1,204
Kentucky (2).....	Southwestern	342	17,029	1,208	357	187	154	494
Missouri (19).....	Southwestern	243	9,033	822	370	280	100	80
West Virginia (17).....	Average Farm		3,255	344	181	148	81	16
<i>Southern States:</i>								
Georgia (14).....	Brooks County	106	8,992	952	592	412	232	52
Georgia (11).....	Sumter "	299	15,781	1,712	923	765	450	134
South Carolina (18).....	Anderson "	92	5,529	404	129	74	37	147
Texas (26).....	Ellis "	79	16,019	1,457	656	496	175	155
<i>Western States:</i>								
Arizona (7).....	Southern	446	20,706	2,370	1,335	1,128	713	300
Montana (9).....	Gallatin Valley	186	27,173	2,185	826	555	13	529
Oregon (16).....	Willamette Valley	212	22,699	1,322	187	39	494	948
Utah (8).....	Provo	75	11,688	1,312	728	611	377	143
Utah (6).....	Six counties	309	11,886	1,135	541	422	184	54
Utah (27).....	Salt Lake Valley	429	12,296	927	312	189	46	303

\* The numbers refer to citations in bibliography.

TABLE 2.—Annual Payment Necessary to Pay for Farm on Amortization Plan in 10, 20, or 30 Years with Interest on Mortgage at 5, 6, 8, or 10 Percent.

State.	Area.	10 Years.				20 Years.				30 Years.			
		5%.	6%.	8%.	10%.	5%.	6%.	8%.	10%.	5%.	6%.	8%.	10%.
<i>North Atlantic States:</i>													
New York.....	Tompkins County	716	751	824	899	443	482	563	649	360	401	491	591
New Jersey.....	Monmouth "	2,482	2,604	2,856	3,119	1,538	1,671	1,952	2,251	1,247	1,392	1,702	2,050
Pennsylvania.....	Chester "	1,358	1,425	1,563	1,706	841	914	1,068	1,232	682	762	931	1,122
<i>North Central States:</i>													
Illinois.....	Kane County	4,908	5,149	5,648	6,168	3,041	3,301	3,859	4,451	2,465	2,753	3,366	4,054
Illinois.....	West Central	6,616	6,941	7,614	8,314	4,100	4,454	5,203	6,001	3,323	3,711	4,538	5,405
Indiana.....	Central	2,271	2,382	2,613	2,853	1,407	1,529	1,786	2,059	1,141	1,273	1,558	1,876
Iowa.....	West Central	3,003	3,151	3,456	3,774	1,861	2,022	2,361	2,724	1,509	1,685	2,060	2,481
Michigan.....	Lenawee County	1,522	1,597	1,754	1,913	943	1,025	1,197	1,381	765	854	1,044	1,258
Minnesota.....	Southeastern	1,895	1,988	2,181	2,382	1,174	1,276	1,491	1,719	952	1,063	1,300	1,566
Nebraska.....	Eastern	3,451	3,620	3,971	4,336	2,138	2,323	2,714	3,130	1,733	1,936	2,367	2,850
Ohio.....	Washington Co.	732	768	842	920	454	493	576	664	368	411	502	605
Wisconsin.....	Green County	4,019	4,217	4,625	5,050	2,490	2,706	3,161	3,645	2,019	2,255	2,757	3,320
<i>South Central States:</i>													
Kentucky.....	Bluegrass Region	4,894	5,135	5,632	6,150	3,033	3,295	3,849	4,439	2,458	2,745	3,357	4,043
Kentucky.....	Southwestern	2,205	2,314	2,538	2,771	1,366	1,485	1,734	2,000	1,108	1,237	1,513	1,822
Missouri.....	Southwestern	1,170	1,227	1,346	1,470	725	787	920	1,060	588	656	802	966
West Virginia.....	Average Farm	422	442	485	530	261	284	331	382	212	236	289	348
<i>Southern States:</i>													
Georgia.....	Brooks County	1,164	1,221	1,340	1,463	722	784	916	1,056	585	653	798	962
Georgia.....	Sumter "	2,022	2,144	2,352	2,568	1,266	1,376	1,607	1,853	1,027	1,146	1,402	1,687
South Carolina.....	Anderson "	716	751	824	900	444	482	563	649	360	402	491	591
Texas.....	Ellis County	2,074	2,177	2,387	2,607	1,285	1,397	1,631	1,882	1,042	1,164	1,423	1,714
<i>Western States:</i>													
Arizona.....	Southern	2,681	2,813	3,086	3,369	1,661	1,805	2,109	2,432	1,347	1,504	1,839	2,215
Montana.....	Gallatin Valley	3,519	3,692	4,050	4,422	2,180	2,369	2,767	3,191	1,768	1,974	2,414	2,907
Oregon.....	Willamette Valley	2,940	3,084	3,383	3,694	1,821	1,979	2,312	2,666	1,477	1,649	2,016	2,428
Utah.....	Provo	1,514	1,588	1,742	1,902	938	1,019	1,190	1,373	760	849	1,038	1,250
Utah.....	Six Counties	1,539	1,615	1,771	1,934	954	1,036	1,210	1,396	773	863	1,056	1,271
Utah.....	Salt Lake Valley	1,592	1,671	1,832	2,001	987	1,072	1,252	1,442	800	893	1,092	1,315

Table 1 by using the ordinary formula for computing annual payments on amortization purchases:

$$R = \frac{Ai}{1 - (1 + i)^{-n}},$$

where  $R$  represents the size of equal annual payments,  $A$  the face of debt,  $i$  the rate of interest, and  $n$  the number of annual payments.

Table 3 shows how much money is left available for family use after making the annual payment including interest at 5, 6, 8, or 10 percent. The farm income represents the total net income of the operator, including interest on the investment. All payment must be made from this fund except for unpaid family labor which is computed and subtracted as an expense, but which is allowed for in Table 5. The annual installment necessary to pay for the farm in each period of time and for each rate of interest is subtracted from the farm income. It is this difference that appears in Table 3. Minus (—) signs indicate that the necessary payment is larger than the farm income by the figure that follows. The absence of signs indicates that the farm income is larger than the necessary payment by the amount shown, which then is the total cash left to defray all family expenses including purchased food, clothing, taxes, education, church donations, and amusements. In justice, let it be remembered that in addition the family has a home in which to live and whatever else the farm contributes directly to family living such as meat, milk, eggs, honey, fruit, vegetables, and fuel. This and rent on the house has been shown to be equal to about \$477 in Nebraska (12); and \$421 as an average for the ten states (13) of North Carolina, Georgia, Texas, Kansas, Iowa, Wisconsin, Ohio, Pennsylvania, New York, and Vermont; \$256 in Arizona (7) and \$600 in some parts of Utah (6), and \$150 in other parts (27). None of this is converted into cash, however, or it would be included as farm income. It cannot, therefore, be used in any way toward paying for the farm, except as it permits more cash to be diverted in that direction.

An analysis of Table 1 shows the capital invested to vary from \$3,255 for the "average farm" of West Virginia to \$51,091 for the grain and livestock area of West Central Illinois. Possibly it may not be fair to take the West Virginia figure for comparison on account of its being a computation from the U. S. Census instead of survey data. If this be left out, then the area of next lowest capital is Tompkins County, New York, with \$5,527. This, however, is not



much lower than the figures for Anderson County, South Carolina, and Washington County, Ohio, which are \$5,529 and \$5,652, respectively. A few of the areas of high capitalization are West Central Illinois with \$51,091; Kane County, Illinois, with \$37,896; the Bluegrass Region, Kentucky, with \$37,793; Green County, Wisconsin, with \$31,036; Gallatin Valley, Montana, with \$27,193; Nebraska, with \$26,646; West Central Iowa, with \$23,193; Willamette Valley, Oregon, with \$22,699; and Arizona, with \$20,706.

It is interesting to note that all of the areas with a very low total investment lie either in the Appalachian hill country or in the Atlantic Coastal Plain, both regions of low-priced land. With the exception of the Willamette Valley in Oregon, all the regions carrying a high investment lie either in the corn belt or in the irrigated regions. In both, land values are usually high and considerable livestock is kept in most cases. In the Willamette area, land values seem to be unwarrantably high for the type of region. This is shown by the large minus labor incomes as soon as the 5 percent interest rate is exceeded. The Utah areas are shown to bear comparatively low investments, in spite of the fact that the land is in the irrigated section and rather high-priced. The low average capitalization is a result of small farms, occasioned in the beginning by a village system of settlement which improved social, religious, and educational conditions somewhat at the expense of later economic welfare. Although much criticized, the Utah village system persists, indicating that some advantages probably offset at least in part the economic disadvantage of living in towns.

Roughly speaking, the large farm incomes are found in connection with large investments, being partly at least a function of high capitalization. There are no very noticeable exceptions, though there is an apparent one when the Nebraska area is compared with Sumter County, Georgia, which has nearly as large a farm income but only about three fifths as large a capital. Many of the farm operators of Sumter County, however, are large landholders who have considerable incomes from land rented out. The tenants are not included in this tabulation on account of the data being so given that only the tenants' share of the investment was given, the total farm investment being not easily ascertainable. It should also be noted that the farm incomes on the Provo area in Utah and Chester County, Pennsylvania, with total investments of \$11,688 and \$10,486, respectively, are approximately as large as those from West Central Iowa, and from the Willamette Valley, Oregon, with double the capital.

TABLE 3.—*Money from Farm Income Available for Family Use when Farm is Purchased on Amortization Plan in 10, 20, or 30 Years with Interest on Mortgage at 5, 6, 8, or 10 Per cent.*

State.	Area.	10 Years.				20 Years.				30 Years.			
		5%.	6%.	8%.	10%.	5%.	6%.	8%.	10%.	5%.	6%.	8%.	10%.
<i>North Atlantic States:</i>													
New York.....	Tompkins County	41	6	67	142	314	275	194	108	397	356	266	166
New Jersey.....	Monmouth "	783	905	1157	1420	161	28	253	552	452	307	3	351
Pennsylvania.....	Chester "	45	112	250	393	472	399	245	81	631	551	382	191
<i>North Central States:</i>													
Illinois.....	Kane County	2142	2383	2882	3402	275	535	1093	1685	301	13	600	1288
Illinois.....	West Central	3440	3765	4438	5138	924	1278	2027	2825	147	535	1362	2289
Indiana.....	Central	1084	1195	1426	1666	220	342	599	872	46	86	371	689
Iowa.....	West Central	1553	1701	2006	2324	411	572	911	1274	59	235	610	1031
Michigan.....	Lenawee County	458	531	684	845	125	43	131	313	303	214	24	190
Minnesota.....	Southeastern	725	818	1017	1212	4	106	321	549	218	107	130	396
Nebraska.....	Eastern	1734	1903	2254	2619	421	606	997	1413	16	219	650	1133
Ohio.....	Washington Co.	291	323	399	473	11	50	133	221	111	32	38	162
Wisconsin.....	Green County	2079	2277	2685	3110	550	766	1221	1705	79	315	817	1380
<i>South Central States:</i>													
Kentucky.....	Bluegrass Region	2318	2559	3056	3574	457	719	1273	1863	118	169	781	1467
Kentucky.....	Southwestern	997	1106	1330	1563	158	277	526	792	100	29	305	614
Missouri.....	Southwestern	348	405	524	648	97	35	98	238	234	166	20	144
West Virginia.....	Average Farm	78	98	141	186	83	60	13	38	132	108	55	44
<i>Southern States:</i>													
Georgia.....	Brooks County	212	269	388	511	230	168	36	104	367	299	154	10
Georgia.....	Sumter "	310	432	642	856	446	336	105	141	685	566	308	25
South Carolina.....	Anderson "	312	347	420	496	40	78	157	245	44	2	87	187
Texas.....	Ellis County	617	720	930	1150	172	60	172	427	415	293	34	257
<i>Western States:</i>													
Arizona.....	Southern	311	443	716	999	709	565	261	52	1023	866	531	155
Montana.....	Gallatin Valley	1334	1507	1865	2337	5	184	582	1006	417	211	229	722
Oregon.....	Willamette Valley	1618	1762	2061	2376	499	657	990	1344	155	327	694	1106
Utah.....	Provo	202	276	430	590	374	293	122	61	552	463	274	62
Utah.....	Six counties	404	480	636	799	181	99	75	261	362	272	79	136
Utah.....	Salt Lake Valley	665	744	905	1005	60	145	325	515	127	34	105	388

Interest rates on farm loans vary rather widely from New York to Georgia or from Iowa to Arizona. On this account the labor incomes are instructive, especially if each area were studied separately in detail. In general, rates are higher in the South and West than in the Central and North Atlantic divisions. This tends to offset the apparently somewhat higher labor incomes.

The data in Table 2 are entirely functions of the total investments as reported in Table 1 and are not, therefore, indicative unless taken in connection with Table 3 which shows the difference between the farm incomes and the necessary annual payments to purchase the farms on the amortization plan.

It is in Table 3 that the real results may be seen. An examination shows that in no case except for Tompkins County, New York, is the farm income large enough to cover the payment if the farms were to be paid for in ten equal annual installments, the mortgages carrying 5 percent interest. Here the unpaid family labor is included in the "farm income." In the New York area only \$41 is left for family use and this decreases to \$6 if the interest rate be raised to 6 percent. In addition to supplying all cash necessary for family expense for the 10 years, enough extra money must be secured each year to make up the annual payment. This amount varies annually from \$45 in the case of Chester County, Pennsylvania, to \$3,440 for the West Central Illinois area. High deficits would be accrued in several other areas, notably \$2,318 for the Bluegrass Region; \$2,142 for Kane County, Illinois; \$2,079 for Green County, Wisconsin; \$1,734 for eastern Nebraska; and \$1,618 for the Oregon area.

At 6 percent the deficits are larger, reaching \$3,765 for West Central Illinois; \$2,559 for the Bluegrass area; \$2,383 for Kane County, Illinois; and \$2,277 for Green County, Wisconsin. At 8 percent they of course run still higher reaching up to \$4,438, \$3,056, \$2,882, \$2,685, \$2,254, \$2,061, and \$2,006 for West Central Illinois, the Bluegrass Region, Kane County, Green County, eastern Nebraska, Willamette Valley, and West Central Iowa, respectively. At 10 percent these figures are, of course, correspondingly increased.

In no area, then, can "average" farms pay for themselves in 10 years, even with 5 percent mortgages. Four percent interest would make it just possible in one or two areas. Perhaps 10 years is too short a time; therefore, let us consider 20 years.

Twenty-year mortgages at 5 percent look possible in four or five places. Southern Arizona shows \$709 left for family use; Chester County, \$474; Sumter County, Georgia, \$446; the Provo area in

Utah, \$374; and Tompkins County, New York, \$314. However, all except the New York and Pennsylvania regions must pay at least 8 percent on the mortgages. This leaves nothing like a decent living income for family use. Only the Arizona and Pennsylvania regions show as much as \$200 left for family use with a 20-year mortgage at 8 percent. None have as much as \$400 left over, whereas nine are from \$500 to \$2,000 behind at 8 percent and six are more than \$300 in arrears at 5 percent. The southern Arizona area is newly settled and advances in land values are likely. It is not at all improbable that the price of Arizona land was too high within two or three years after the survey to leave any money for family use on a 20-year 8-percent mortgage.

Twenty years also seems not enough time for a farm to pay for itself, unless 4 percent rates could be had.

If the time be extended to 30 years, 11 of the 26 areas would have as much as \$300 in cash left after making the necessary annual payment. Seven others would have between \$100 and \$300; two would have between nothing and \$100. Set against these are five still with deficits. At 8 percent only three areas have as much as \$300 left over, and only one—Arizona—with more than \$400. The probability of an advance in land value in that region has already been mentioned. Here particularly 4 percent rates would cause things to brighten up considerably.

But interest rates vary by regions. A study by states (22) gives the average rates for each state as shown in Table 4. The necessary payment at the ascertained interest rate and the money left over is also included. It is apparent from the table that only the New York and Pennsylvania regions can pay for their farms in 20 years and that these do not have enough money left for a very handsome living. In 30 years eight other areas can just manage the payments with a little over to live on. These areas are New Jersey, Michigan, Missouri, West Virginia, two Georgia areas, Arizona, and the Provo area in Utah. The others either cannot make the payment or else have so little money left for family use as to make living very meager.

A few areas have appreciable deficits for 30-year amortization. They are: West Central Illinois, \$535; Iowa, \$217; Nebraska, \$457; Wisconsin, \$269; Kentucky (Bluegrass), \$506; Montana, \$722; and Oregon, \$694.

Finally, unpaid family labor must be taken into account. In the survey data it is usually subtracted as a general farm expense. This is not available for all the areas but is for somewhat more than half

TABLE 4.—Average Interest Rate on Mortgage Loans in Various States Together with Necessary Annual Payment and Money Available for Family Use when Farm is Bought on Amortization Plan in 10, 20 or 30 Years.

Area.	Average Interest Rate.	10 Years.		20 Years.		30 Years.	
		Necessary Payment.	Money Left.	Necessary Payment.	Money Left.	Necessary Payment.	Money Left.
<i>North Atlantic States:</i>							
New York.....	5.6	749	18	466	291	385	372
New Jersey.....	5.8	2,580	— 881	1,644	55	1,363	336
Pennsylvania.....	5.8	1,412	— 99	900	413	746	557
<i>Northern Central States:</i>							
Illinois (Kane Co.).....	6.0	5,149	— 2,383	3,301	— 535	2,753	13
Illinois (West Central)...	6.0	6,941	— 3,765	4,454	— 1,278	3,711	— 535
Indiana.....	6.2	2,428	— 1,241	1,555	— 368	1,302	— 115
Iowa.....	5.9	3,136	— 1,686	2,006	— 556	1,667	— 217
Michigan.....	6.6	1,652	— 584	1,077	— 9	911	157
Minnesota.....	6.8	2,065	— 895	1,362	— 192	1,158	12
Nebraska.....	7.1	3,814	— 2,097	2,539	— 822	2,174	— 457
Ohio.....	6.1	772	— 329	497	— 54	316	27
Wisconsin.....	5.8	4,177	— 2,237	2,663	— 723	2,208	— 269
<i>South Central States:</i>							
Kentucky (Bluegrass)....	7.1	5,409	— 2,833	3,600	— 1,024	3,082	— 506
Kentucky (southwestern)...	7.1	2,437	— 1,229	1,623	— 415	1,389	— 181
Missouri.....	6.8	1,275	— 453	841	— 19	714	108
West Virginia.....	6.4	451	— 107	293	51	247	97
<i>Southern States:</i>							
Georgia (Brooks Co.)....	8.7	1,383	— 431	965	— 13	846	106
Georgia (Sumter Co.)....	8.7	2,428	— 716	1,693	19	1,502	210
South Carolina.....	8.4	839	— 435	580	— 176	511	— 107
Texas.....	9.0	2,497	— 1,040	1,757	— 300	1,569	— 112
<i>Western States:</i>							
Arizona.....	9.4	3,283	— 913	2,336	44	2,102	268
Montana.....	10.0	4,422	— 2,337	3,191	— 1,006	2,907	— 722
Oregon.....	8.0	3,383	— 2,061	2,312	— 990	2,016	— 694
Utah (Provo).....	9.0	1,822	— 510	1,281	31	1,144	168
Utah (six counties).....	9.0	1,852	— 717	1,303	— 168	1,163	— 28
Utah (Salt Lake Valley)...	9.0	1,917	— 990	1,347	— 420	1,204	— 277

of them. When this is added to the farm income, a somewhat larger figure is secured, which for convenience I have called the family-farm income.

Tables 4 and 5 show that except in two or three cases this has had comparatively little effect on the money available after amortization, because as a whole unpaid family labor is not a large item.

In addition, it must be borne in mind that mortgages must be renewed at intervals of a few years. This involves inconvenience and also extra expense of various sorts which further decrease the already slender remnants of the family-farm income.

In this connection it is only just to state that in several regions a few of the best farms are reported in a separate group. These would pay for themselves easily in 20 years—some of them in 10 years. But

TABLE 5.—*The Farm Income with Unpaid Family Labor Added to Get Family-Farm Income. The Money Available After 20-year and 30-year Amortization at Existing Interest Rate is Also Shown.*

Area.	Farm Income.	Unpaid Family Labor.	Family Farm Income.	Money Available for Family Use when Farm is Bought in	
				20 Years.	30 Years.
New York.....	757	{ included in farm income	757	291	372
Illinois (west Central).....	3,176	127	3,303	— 1,151	— 408
Indiana.....	1,187	86	1,263	— 282	— 29
Iowa.....	1,450	101	1,551	— 455	— 116
Minnesota.....	1,170	170	1,340	— 22	182
Ohio.....	443	87	530	33	114
Kentucky (Southwestern)....	1,208	81	1,289	— 334	— 100
West Virginia.....	344	{ included in farm income	344	51	97
Georgia (Brooks Co.).....	952	101	1,053	88	207
Georgia (Sumter Co.).....	1,712	45	1,757	64	255
Texas.....	1,457	203	1,660	— 97	91
Montana.....	2,185	112	2,297	— 894	— 610
Utah (Provo).....	1,312	154	1,466	185	322
Utah (Salt Lake Valley).....	927	149	1,076	— 271	— 128

these best farms are not for sale: they do not get on the market. Ordinary purchasers have to be content with poorer bargains, especially where they need considerable credit.

Finally, these calculations assume that a purchasing operator can run the farm as successfully as the present occupant who is already well acquainted with his specific problems. This of course is questionable for the "average" man at least during the first four or five crucial years. To buy a farm successfully, then, a man must be well-trained and efficient. The farm can no longer be a dumping ground. Only the fit can survive.

Is it possible that the farm lands of the United States except in regions of earlier settlement are over-capitalized? After a region is definitely settled, do the prices of farm lands tend to return to values justified by production, whereas in newer regions, speculative possibilities tend to keep land prices somewhat above what is justified by purely agricultural returns?

Some persons maintain that the survey method is fraught with possibility of error. Perhaps the most frequently urged objection is that it is based on farmers' estimates. The Office of Farm Management in the United States Department of Agriculture has investigated this matter. Spillman (20) concluded that in view of the large

number of farms from which data can be drawn and when trained enumerators are employed the results are rather accurate. He further feels that the degree of accuracy attainable is greater than that possible in field experiments by the plot method. In one place he says:<sup>2</sup>

The opinion prevails quite widely, even among farmers themselves, that the average farmer knows very little of the details of his business. The results given in the foregoing pages indicate that this opinion is not consistent with facts. During the past decade the Office of Farm Management has analyzed the business of nearly 20,000 farms. The experience gained in this work indicates that the average farmer does know the details of his business with a fair degree of accuracy, the discrepancy in his knowledge being relatively small in the case of the larger and more important items, but increasing as the importance of the items decreases.

Again he says:<sup>3</sup>

Even if the probable error of the individual estimates is as much as 25 percent, the probable error of the average of 100 such estimates is only 2½ percent. Hence, even if the farmer's knowledge of the details of his business were even less definite than experience has shown it to be it would still be possible to get fairly reliable results by securing large numbers of estimates and using only averages of them. This principle is taken advantage of in the study of farm practice, and there is reason to believe that, within the proper limits of use of the results obtained, studies of this kind are entitled to at least as much consideration from the standpoint of accuracy as are those involving experimental work conducted under the most favorable field conditions. Indeed it is believed that when carefully conducted by those properly trained both in the collection of data and in the interpretation of these data, the results of such studies approach in accuracy those obtained in laboratory investigations.

. . . A little consideration will show that in a highly variable quantity, such as the yield of a given plot treated in a given way, six duplicate plots is far too small a number to insure with any degree of certainty that the action of the law of averages will eliminate the departures from the true average. In general, the average of six such yields, no matter how accurately each yield is measured, is far less reliable than would be the average of 60 estimates of farmers based on years of experience with a given field. Sixty such estimates give a chance for the law of averages to eliminate a large proportion of the errors in the individual estimates, and these errors are in general no larger than those in plot yields, no matter how accurately these yields are measured.

. . . Our studies lead to the conclusion that errors in the farmer's knowledge of the details of his business and of the work he does are in every way comparable to the departures from the true mean in field plot experimental work and that they distribute themselves about the true values in approximately the same manner. The fact that the survey method of investigation gives data sufficient to permit the law of averages to eliminate plus errors by the occurrence of similar minus errors while plot experiments ordinarily do

<sup>2</sup> U. S. Dept. Agr. Bul. 529, p. 7.

<sup>3</sup> Loc. cit., pp. 10, 11.

not do this appears to justify that statement that the survey method is a more reliable means of arriving at those facts to which it is applicable than the field plot experimental method. It appears, in fact, to occupy a place intermediate between plot experiments on the one hand, where variations in other factors than that under observation occur and are not adequately eliminated, and laboratory studies on the other hand, in which variations in other factors are largely prevented. These variations due to factors other than that studied do occur in using the survey method, but the amount of data obtained by this method is sufficient to permit the elimination of such variations by the operation of the law of averages.

Warren (24) also favors the method. He says<sup>4</sup> in part:

But when we deal with living things or with farming as a business, however accurate our measurements, we must have many of them in order to obtain reliable results even if the individual results are absolutely correct. If we want to know how much an average cow weighs, we can never find out by the most accurate weighing of a single cow. She may not be an average cow. The weight of a thousand cows, each weighed to the nearest 100 pounds, would be infinitely more reliable than the weight of a single cow that was accurate to the nearest milligram.

If we kept the most accurate cost accounts on fifty farms, the results would be much less reliable than survey figures from one thousand farms. The danger of error from not having typical farms is greater than the errors in individual records when careful survey work is done.

In a survey in New Hampshire 135 farmers were asked to estimate the amount that they received from the sale of milk during the past year. These figures were compared with the actual payments made by the creameries. The total of the estimates was almost exactly correct, the error being only .0034 of 1 percent. The amount of milk sold was estimated by 79 farmers. The error of the total was less than 1 percent.

Finally it should be borne in mind that, in working up the tables, wherever averages were used they were so weighted as to show true averages, thus reducing the error from that source.

#### CONCLUSIONS.

In view of the data presented it seems that "average" farms are not earning large enough total incomes to buy the farms in 20 years at normal interest rates. The farms of a few regions can do so in 30 years with small cash balances left for family expense. Living would even then have to be frugal to say nothing of amusements and social life. Education of the boys and girls in another town—even one at a time—is almost out of the question. In the great agricultural states of the mid-continental region not a single area as a whole can pay for its farms and have enough money for necessities to

<sup>4</sup> Cornell Bul. 344, p. 425.



say nothing of education, pleasure, or charity. Other areas, except in the North Atlantic region, are but little better off. The farms seem over capitalized. The dice are loaded against the untrained man with small capital and moderate ability, who wishes to become a farm owner. Is it surprising that tenancy continues to increase?

It seems fair, therefore, to conclude that only they who are well-fitted by training or experience, and who in addition possess somewhat more business ability, than the "average" farm operator should expect to earn a living on the farm and at the same time save enough to buy the farm.

#### LITERATURE CITED.

1. App, Frank. Farm Profits and Factors Influencing Farm Profits on 370 Potato Farms in Monmouth County, New Jersey. New Jersey Bul. 294, pp. 3-103.
2. Arnold, J. H. A Study of Farming in Southwestern Kentucky. U. S. Dept. of Agr. Bul. 713, pp. 1-19.
3. Arnold, J. H., and Nicholls, W. C. Important Factors for Successful Farming in the Bluegrass Region of Kentucky. Kentucky Bul. 210, pp. 169-206.
4. Boeger, E. A. A Study of Share-rented Dairy Farms in Green County, Wisconsin, and Kane County, Illinois. U. S. Dept. of Agr. Bul. 603, pp. 1-15.
5. Boss, Andrew, Benton, A. H., and Calvert, W. L. A Farm Management Study in Southeastern Minnesota, Minn. Bul. 172, pp. 3-51.
6. Brossard, E. B. Important Factors in the Operation of Irrigated Utah Farms. Utah Bul. 160, pp. 3-48.
7. Clothier, R. W. Farm Organization in the Irrigated Valleys of Southern Arizona. U. S. Dept. of Agr. Bul. 654, pp. 1-59.
8. Connor, L. G. Farm Management and Farm Profits on Irrigated Land in the Provo Area, Utah Lake Valley. U. S. Dept. of Agr. Bul. 582, pp. 1-40.
9. Currier, E. L. Profits in Farming on Irrigated Areas in the Gallatin Valley, Montana. Montana Bul. 111, pp. 3-52.
10. Dixon, H. M., and Drake, J. A. A Study of Farm Management Problems in Lenawee County, Michigan. U. S. Dept. of Agr. Bul. 694, pp. 1-36.
11. Dixon, H. M., and Hawthorne, H. W. An Economic Study of Farming in Sumter County, Georgia. U. S. Dept. of Agr. Bul. 492, pp. 1-64.
12. Filley, H. C. Farm Management Studies in Eastern Nebraska, Nebraska Bul. 157, pp. 3-32.
13. Funk, W. C. What the Farm Contributes Directly to the Farmer's Living. U. S. Dept. of Agr. Farmers' Bul. 635, pp. 1-15.
14. Haskell, E. S. A Farm Management Survey in Brooks County, Georgia. U. S. Dept. of Agr. Bul. 648, pp. 1-60.
15. Hawthorne, H. W. A Five-Year Farm Management Survey in Palmer Township, Washington County, Ohio, 1912-16. U. S. Dept. of Agr. Bul. 716, pp. 1-53.

16. Hunter, Byron, and Jayne, S. O. Profitable Management of General Farms in the Willamette Valley, Oregon. U. S. Dept. of Agr. Bul. 705, pp. 1-24.
17. Johnson, O. M. Agricultural Production in West Virginia. W. Va. Bul. 144, pp. 37-68.
18. Smith, A. G. A Farm-Management Study in Anderson County, South Carolina. U. S. Dept. of Agr. Bul. 651, pp. 1-32.
19. Spillman, W. J. Factors in Successful Farming near Monett, Mo. U. S. Dept. of Agr. Bul. 633, pp. 1-28.
20. Spillman, W. J. Validity of the Survey Method of Research. U. S. Dept. of Agr. Bul. 529, pp. 1-15.
21. Spillman, W. J., Dixon, H. M., and Billings, G. A. Farm Management Practice of Chester County, Pa. U. S. Dept. of Agr. Bul. 341, pp. 1-99.
22. Thompson, C. W. Cost and Sources of Farm Mortgage Loans in the United States. U. S. Dept. of Agr. Bul. 384, pp. 1-16.
23. Thomas, E. H., and Dixon, H. M. A Farm Management Survey of Three Representative Areas in Indiana, Illinois, and Iowa. U. S. Dept. of Agr. Bul. 41, pp. 1-42.
24. Warren, G. F. Agricultural Surveys. Cornell Bul. 344, pp. 419-433.
25. Warren, G. F., and Livermore, K. C. An Agricultural Survey of Tompkins County, N. Y. Cornell Bul. 295, pp. 375-569.
26. Willard, Rex E. A Farm-Management Study of Cotton Farms of Ellis County, Texas. U. S. Dept. of Agr. Bul. 659, pp. 1-54.
27. Unpublished data at Utah Experiment Station. Farm-Management Survey of Great Salt Lake Valley, Utah.

### NEWS NOTES.

Mr. Asher Hobson, formerly assistant chief in the Office of Farm Management and Farm Economics, U. S. Department of Agriculture, has accepted a position as associate professor of marketing in Columbia University, New York. Mr. Hobson will assume his new duties during the month of September.

Mr. G. W. Forster, formerly assistant professor of agricultural economics in the University of Kentucky at Lexington, has been appointed assistant chief in the Office of Farm Management and Farm Economics, Washington, D. C.

Mr. R. V. Wright has been appointed farm management demonstrator in California to succeed Mr. A. N. Nathan, who has resigned to go into commercial work. Mr. Wright is a graduate of the Oregon Agricultural College and since graduation has spent three years as manager of the Oregon State Boys' Farm and two years as a Smith-Hughes agricultural teacher in the Hood River section.

Miss Cora Feldcamp, formerly Librarian in the Office of Farm Management and Farm Economics, has assumed similar duties at the Agricultural College, East Lansing, Michigan.